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VISUALLY IMPAIRED E-COMMERCE WEBSITE

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ABSTRACT

Online shopping has influenced the way we live in today's world. It has made life comfortable and easier. The growth of these have completely changed the shopping scenario as the customer does not have to physically visit a shop. But the online shopping method is not easily accessible to all the people, especially the visually impaired people. Currently there are no visually impaired friendly e-commerce websites. The lack of existing modules makes it very difficult for visually impaired people to navigate through a site and be successful at making a purchase. The primary objective of our project was to create an e-commerce platform that caters specifically to the needs of visually impaired individuals. So this is a website design that allows visually impaired users to access and shop without any assistance. The system gives voice instruction to users and an input is requested from the user and it works on the basis of NLP.

Keywords: NLP-Natural Language Processing, AI

1. INTRODUCTION

E-Commerce is becoming popular and expanding widely with the help of the internet. People rely on them for buying and selling things. There is an increasing trend of online shoppers throughout the years .According to the World Health Organization (WHO) there are around 1.3 billion people in the world that are visually impaired out of which 36 million are blind . Since most websites are not visually impaired friendly a lot of these people need constant assistance while shopping online. In 2016, the government of India took initiative to make 100 government websites visually impaired friendly but none of them achieved the goal successfully. In India, none of the non-government websites are accessible to the visually impaired people. All these circumstances affect the autonomy of a visually impaired individual. The shortness of tool such as audio features, detailed description and linear navigation forces a visually impaired person to take assistance from someone and makes it significantly difficult for them to shop online. This is the most frequent reason that they do not prefer to shop online. This work is concentrated on an accessible E-commerce website that helps a visually impaired or a blind person to shop and order products online, and also it focuses on different tools, techniques and methods used by developers' in recent years, problems faced by visually impaired in prevailing technology, solution for the same.

2. PROPOSED SYSTEM

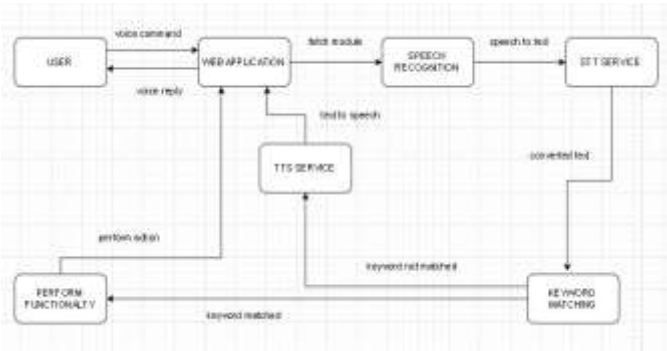

Figure 2.1: System Architecture

During the initial stage, the system collects voice input from the user and the voice will be transferred to the web server. It is converted into text. It is then processed and this text command is converted into voice command in the form of reply. The voice command is sent to the user from the server side. This system mainly works on the basis of speech recognition technique and Natural Language Processing (NLP).

- With the help of speech recognition and NLP, the user provides their voice as input.
- Using voice commands, the user could navigate to the specific product that they wish to buy.
- Considering that speech synthesis is converted to text and the action of booking a product is performed.

- Check whether the converted text is matching with the keyword. If yes, perform functionality.
- For each speech input, the system ensures an action to be performed by providing a return voice verification.
- The predefined text is converted to voice with NLP.
- After the order is placed successfully, payment will be followed in COD mode.

3. METHODOLOGY

System Design and Implementation

Project has been mainly divided into three modules.

3.1 Module 1 : User Interface Layer:

React, as a module, provides a powerful and efficient way to develop user interfaces for web applications. Its component-based architecture allows for the creation of reusable UI elements, promoting code re-usability and maintainability. With React, developers can build interactive and dynamic user interfaces that respond to user actions and data changes in real time. One of the key advantages of using React for UI development is its declarative nature. Developers can describe how the UI should look based on the current application state, and React takes care of efficiently updating and rendering the components when the state changes. This declarative approach simplifies the development process and reduces the chances of introducing bugs or inconsistencies in the UI.

3.2 Module 2 : Voice Recognition Layer

The Voice Recognition Layer is an essential component in modern applications that aims to provide seamless and intuitive user experiences through voice commands. This layer leverages advanced technologies such as Natural Language Processing (NLP) and Machine Learning (ML) to convert spoken language into text, enabling the application to understand and interpret user inputs.

The Voice Recognition Layer typically involves several steps, including audio capturing, speech-to-text conversion, language processing, and command interpretation. These voice functions all are provide by Alan AI. First we integrare the alan ai key to the website code. Then we define code for each actions to be performed both in main code and Alan Ai website. Possible ways to execute an action can also be done with this new ai integration tool.

3.3 Module 3: Data Storage Layer

Storing data in JSON files and using Firebase are two popular approaches for managing and persisting data in web applications. JSON (JavaScript Object Notation) is a lightweight data-interchange format that is widely used for storing and transmitting structured data. It provides a simple and human-readable syntax, making it easy to work with and understand. Storing data in JSON files involves creating and maintaining a file or a collection of files in the JSON format. The data can be structured as objects, arrays, and key-value pairs, allowing for efficient organization and retrieval. JSON files are commonly used for local data storage or as a means to transfer data between systems.

On the other hand, Firebase is a comprehensive backend-as-a-service (BaaS) platform provided by Google. It offers a wide range of features and services for building web and mobile applications, including real-time database, authentication, cloud storage, and more. Firebase's real-time database is a NoSQL database that allows developers to store and sync data in real-time across clients. It provides an easy-to-use API and SDKs for various platforms, including React, enabling seamless integration with front-end applications. Firebase's real-time database is particularly suitable for applications that require real-time updates and collaborative features.

Overall the voice is taken as an input from the mic icon provided by Alan AI. First the user must touch and enable the mic for processing voice commands. After receiving voice the system checks if there is defined action for the specific command done by the users, if not, a voice saying that the ai has not detected the specific action to be performed is received by the users. Users can search items, add items to cart, purchase items etc.. The details obtained from the orders page are then send back to the admin's email.

4. RESULTS AND ANALYSIS

The utilization of voice-controlled technology in e-commerce websites has revolutionized the way users interact and engage with online shopping platforms. Voice-controlled e-commerce websites offer a seamless and intuitive user experience by enabling customers to navigate through the website, search for products, and make purchases using voice commands.

This innovative approach eliminates the need for traditional manual inputs and provides a hands-free and efficient way to interact with online stores. By integrating voice recognition technology, these e-commerce websites offer enhanced accessibility and convenience, particularly for individuals with physical disabilities or those who prefer a more natural and effortless shopping experience. Users can simply speak their commands or queries, and the system accurately interprets and executes their requests. Voice-controlled e-commerce websites leverage advanced natural language

processing (NLP) algorithms and machine learning techniques to understand and interpret user input, ensuring accurate product recommendations and personalized shopping experiences.

The benefits of voice-controlled e-commerce websites extend beyond convenience and accessibility. They also enable businesses to gain a competitive edge by providing a differentiated user experience. With voice search becoming increasingly popular, these websites can attract and retain a wider customer base, leading to increased sales and customer satisfaction. Moreover, the integration of voice-controlled technology opens up possibilities for future advancements, such as voice-based virtual assistants and personalized voice recommendations, further enhancing the overall e-commerce experience. As technology continues to advance, voice-controlled e-commerce websites are poised to play a significant role in shaping the future of online shopping, offering a more intuitive, seamless, and personalized journey for customers.

5. CHALLENGES

Creating an accessible and user-friendly e-commerce website for visually impaired individuals comes with several challenges. Here are some of the main challenges:

5.1 Color contrast: Ensuring sufficient color contrast between text and background elements is crucial for users with low vision. Providing high contrast options or allowing users to customize the color scheme can greatly enhance the readability of the website.

5.2 Visual content accessibility: Visually impaired users heavily rely on assistive technologies such as screen readers and braille displays to access website content. Ensuring that all visual elements, such as product images, banners, and icons, are adequately described using alternative text (alt text) is crucial for providing a meaningful experience to visually impaired users.

5.3 Navigational structure: Designing a clear and intuitive navigational structure is essential for visually impaired users. They often rely on keyboard navigation or screen reader navigation to explore a website. Implementing proper headings, landmarks, and skip links can help users navigate through different sections of the website efficiently.

5.4 Form accessibility: Forms play a crucial role in e-commerce websites for tasks like registration, login, and checkout. Designing accessible forms involves using appropriate labels, clear instructions, error validation messages, and ensuring compatibility with assistive technologies.

Addressing these challenges requires a combination of thoughtful design, adherence to accessibility guidelines (such as WCAG 2.1), and user-centric testing. It's also worth considering consulting with accessibility experts or involving visually impaired individuals in the development and testing process to ensure a truly accessible e-commerce website.

6. CONCLUSION

Online shopping is rapidly turning into a new trend because of its simplicity. Everything one needs is available online. In this busy world, it is time-saving and easy.But these facilities are not easily accessible to the visually challenged people. So the main focus of this system was on the blind people who cannot use the E-commerce website on their own. The main motivation for development of such website is lack of availability of visually impaired friendly ecommerce website. The website has linear navigation through entire website and processes voice output to instruct users about each step and the inputs to be provided so that it is easier for navigation.

To compensate for the lack of visual cues, the website utilizes voice output to provide audio instructions and guidance to users throughout their shopping journey. Voice prompts guide users through each step of the purchasing process, ensuring they receive detailed information about the products, prices, and other relevant details.

Recognizing the challenges faced by visually impaired users in entering information, the website simplifies the input process. It incorporates voice recognition technology, allowing users to provide input through spoken commands instead of relying solely on manual typing. Also, all product images are accompanied by detailed text descriptions, enabling visually impaired users to gain a comprehensive understanding of the items without relying on visual content.

The visually impaired-friendly E-Commerce website aims to empower individuals with visual impairments, providing them with equal opportunities to explore and engage in online shopping. By breaking down accessibility barriers, this website enables visually impaired users to independently browse and purchase products, enhancing their overall quality of life. It saves their time and effort, enabling them to conveniently access a wide range of products and services from the comfort of their homes. In conclusion, the development of a visually impaired-friendly E-Commerce website aims to address the accessibility challenges faced by visually impaired individuals in the realm of online shopping. By implementing features such as linear navigation, voice output, simplified input, and clear text descriptions, the website strives to create an inclusive and empowering shopping experience. Moving forward, continued collaboration, user feedback, and technological advancements will drive further improvements, ensuring that visually impaired individuals can fully embrace the benefits and convenience of online shopping

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